
American River Basin

Attachment 10: Costs and Benefits Summary

Overview	1
Project 1: City of Roseville ASR Program – Phase 2 (<i>City of Roseville</i>)	2
Project 2: Secret Ravine Fish Passage Improvement Project (<i>City of Roseville</i>).....	3
Project 3: E.A. Fairbairn Groundwater Well Project (<i>City of Sacramento</i>).....	3
Project 4: Shasta Park Reservoir and Well Project (<i>City of Sacramento</i>).....	4
Project 5: Antelope Creek Water Efficiency and Flood Control Improvement Project (<i>Placer County Flood Control and Water Conservation District & Placer County Water Agency</i>)	4
Project 6: Regional Water Meter Retrofit Acceleration Project (<i>Regional Water Authority</i>).....	5
Project 7: Regional Indoor and Outdoor Water Efficiency Project (<i>Regional Water Authority</i>).....	5
Project 8: Sacramento Regional County Sanitation District/ Sacramento Power Authority Recycled Water Project (<i>Sacramento Regional County Sanitation District</i>)	6
Project 9: North Antelope Booster Pump Station Project (<i>Sacramento Suburban Water District</i>).....	7
Project 10: Coyle Avenue & Roseview Park Pump Stations and Treatment System Project (<i>Sacramento Suburban Water District</i>).....	7
Project 11: Willow Hill Pipeline Rehabilitation Project (<i>City of Folsom</i>).....	8
Project 12: Lower American River Mile 0.5 Aquatic Riparian Habitat Enhancement Project (<i>Sacramento Area Flood Control Agency</i>).....	9
Project 13: Lower Cosumnes River Floodplain Restoration Project (<i>Ducks Unlimited</i>).....	10
Project 14: OHWD / Rancho Murieta Groundwater Recharge Project (<i>Omoichumne-Hartnell Water District & Rancho Murieta Community Services District</i>)	12
Project 15: Sleepy Hollow Detention Basin Retrofit Project (<i>City of Elk Grove</i>)	13

Overview

The fifteen projects of this proposal provide a broad array of benefits within the ARB region and externally to the Bay-Delta. Attachments 7, 8, and 9 detail the water supply, water quality and other benefits, and flood protection benefits, respectively. This attachment provides a summary of the costs and benefits.

The total capital cost for the projects in this proposal is \$53,643,468. The total present value cost of the projects is \$56,815,027, and together, these projects provide cumulative quantitative benefits of \$80,960,957. This is equivalent to an overall benefit-cost ratio of 1.4.

It is important to note that the quantitative analyses do not reflect all the benefits provided by the fifteen proposed projects. In fact, one of the fifteen projects in this proposal (the Lower American River Mile 0.5 Aquatic Riparian Habitat Enhancement Project) does not have any quantifiable benefits but is a priority project for the region because of its numerous environmental benefits. As documented in Attachments 7, 8, and 9, this proposal possesses numerous benefits for which monetary values cannot

easily be assigned. These qualitative benefits are reviewed in the following sections for each project. The overall quantifiable benefits of this proposal are summarized in Table 20, Proposal Project Costs and Benefits Summary.

Project 1: City of Roseville ASR Program – Phase 2 (*City of Roseville*)

The City of Roseville ASR Program – Phase 2 has both quantifiable and non-quantifiable benefits. The monetized water supply benefits are presented in Table 20. Additional qualitative water supply, water quality, and other benefits are as follows:

Qualitative Water Supply Benefits

- **Improved operational flexibility for City of Roseville.** By improving the City's ability to store excess water underground for later use, the ASR Program provides an equitable, cost-effective water resource management strategy for enhancing water supply reliability, and operational flexibility for water users of Folsom Lake, the Lower American River, and the connected groundwater basin.
- **Increased water supply reliability values for customers.** The results of limited studies indicate that residential and industrial customers seem to value supply reliability quite highly. Stated preference studies find that the annual value of reliability ranges from \$95 to \$500 (in 2009 USD) per household for total reliability (i.e., a 0% probability of facing water restrictions in times of drought). This project will only enhance overall reliability but not guarantee 100% reliability. Because of uncertainty in the application of the literature to this project context, and given that added reliability values may, to some degree, double-count benefits with the avoided costs of alternative supplies (which have been quantified), an empirical estimate was not included for increased water supply reliability values.

Qualitative Water Quality/Other Expected Benefits

- **Manage the groundwater aquifer as a sustainable resource.** The ASR program, by the ongoing recharge of groundwater supplies and conjunctive use of water types, contributes to improving sustainable conditions for the aquifer and the Lower American River.
- **Meet regional conjunctive use goals.** The ASR program is an element of a comprehensive, regional conjunctive use program being implemented in southern Placer County and northern Sacramento County. The regional conjunctive use program provides opportunities to reduce stress on the Sacramento-San Joaquin Delta system during dry periods, increasing surface flows through seasonal groundwater banking and surface water exchange.

Project 2: Secret Ravine Fish Passage Improvement Project (*City of Roseville*)

The Secret Ravine Fish Passage Improvement Project has both quantifiable and non-quantifiable benefits. The monetized water quality benefits are presented in Table 20. Additional qualitative water quality, flood damage reduction, and other benefits are as follows:

Qualitative Water Quality/Other Expected Benefits

- **Expanded and enhanced salmon habitat.** In addition to restoring local fish habitat, this project will enable salmon to gain access to ten additional river miles of good spawning habitat. There is a body of empirical evidence in the economics literature suggesting the public places considerable willingness to pay values on preserving and enhancing special status salmon and their habitat.
- **Enhanced recreation.** The Secret Ravine Fish Passage Improvement Project includes trail improvements, a new viewing area, a new access point and interpretive signage that will encourage users to visit the project and observe fish migration and spawning. The site is immediately adjacent to the City of Roseville's Miner's Ravine Bike Trail, a heavily-traveled trail used by bicyclists and pedestrians. There is currently a "desire line" (or a beaten down path in the grass or brush where a planned trail does not yet exist) indicating the public demand for a trail at this location.

Qualitative Flood Damage Reduction Benefits

- **Flood damage mitigation.** The restored channel will provide for overbank flows that will flood adjacent open space areas and relieve flooding of more constricted developed areas. It will also reduce erosion of banks and substrate, thus decreasing sediment transport in stormwater.

Project 3: E.A. Fairbairn Groundwater Well Project (*City of Sacramento*)

The E.A. Fairbairn Groundwater Well Project has both quantifiable and non-quantifiable benefits. The monetized water supply benefits are presented in Table 20. Additional qualitative water quality and other benefits are as follows:

Qualitative Water Quality/Other Expected Benefits

- **Contribution to maintaining water flow in the American River and the Delta.** The project will contribute to the regional conjunctive use program as developed under the Water Forum Agreement for sustaining American River hydrologic resources and to future flexibility in addressing flow requirements in the Sacramento-San Joaquin Delta. This project will allow the system to voluntarily use groundwater, maintaining flows in the American River and Delta.

Project 4: Shasta Park Reservoir and Well Project (*City of Sacramento*)

The Shasta Park Reservoir and Well Project has both quantifiable and non-quantifiable benefits. The monetized water supply benefits are presented in Table 20. Additional qualitative water supply and other benefits are as follows:

Qualitative Water Supply Benefits

- **Improved service to a disadvantaged area of the City of Sacramento.** The project will improve water supply service in a disadvantaged area of the City of Sacramento by improving water pressure in summer months which in the past has been difficult to sustain at the same level as other months. This has been a factor in discouraging economic development in that area.
- **Improved local firefighting capability.** This project will enhance local firefighting capabilities in the part of Sacramento around Shasta Park, by providing a local source of water and by improving the water pressure in summer months.

Qualitative Water Quality/Other Expected Benefits

- **Allows system to voluntarily use groundwater and when doing so will contribute to maintaining water flow in the Delta.** This project will also contribute to regional conjunctive use operations, furthering the program in the Sacramento area to sustain flows in the American River under a variety of hydrologic conditions, and to operational flexibility in meeting future needs to sustain flows into the Sacramento-San Joaquin Delta.

Project 5: Antelope Creek Water Efficiency and Flood Control Improvement Project (*Placer County Flood Control and Water Conservation District & Placer County Water Agency*)

The Antelope Creek Water Efficiency and Flood Control Project has both quantifiable and non-quantifiable benefits. The monetized water supply and flood damage reduction benefits are presented in Table 20. Additional qualitative water supply benefits are as follows:

Qualitative Water Supply Benefits

- **Increased water supply reliability.** The project will reduce water losses from the Antelope Canal and, as a result, will decrease the amount of water that must be transferred into the canal. As a result, the project will improve water supply reliability within the service areas of the PCWA.
- **Improved operational flexibility for PCWA.** By avoiding the use of imported water, the project will marginally help PCWA in their supply efforts by allowing for longer shutdowns, deferring capital improvements, and improving reliability in a vulnerable part of the system.

Qualitative Water Quality/Other Expected Benefits

- **Improved water quality.** Water quality benefits will also be achieved by the project as the raw water in the Antelope Canal will no longer be in contact with bare earth, resulting in reduced

sediment load, turbidity and exposure to other soil contaminants and organics. These benefits will also be transferred downstream to Antelope Creek and other creeks where spill waters during high flows from the canal are directed.

Project 6: Regional Water Meter Retrofit Acceleration Project (*Regional Water Authority*)

The Regional Water Meter Retrofit Acceleration Project has both quantifiable and non-quantifiable benefits. The monetized water supply benefits are presented in Table 20. Additional qualitative water supply and other benefits are as follows:

Qualitative Water Supply Benefits

- **Effectively implement a water loss control program.** Accurate metering of residential usage is essential for conducting a program to reduce water losses in the distribution system. This can lead to significant benefits in identifying and reducing water loss and achieving water conservation goals.

Qualitative Water Quality/Other Expected Benefits

- **Reduced energy demand and carbon footprint.** By decreasing water demands through conservation, this project will lead to energy savings and a reduced carbon footprint. This project will lower utility energy use by an estimated 82 MWh/year. Over the expected 25 year lifetime of the meters, the savings will be 2,050 MWh. Carbon dioxide (CO₂) emissions would be reduced by 820 metric tons over the 25 year life of this project, or 32.8 metric tons per year.

Project 7: Regional Indoor and Outdoor Water Efficiency Project (*Regional Water Authority*)

The Regional Indoor and Outdoor Water Efficiency Project has both quantifiable and non-quantifiable benefits. The monetized water supply benefits are presented in Table 20. Additional qualitative water quality and other benefits are as follows:

Qualitative Water Quality/Other Expected Benefits

- **Reduced energy demand and carbon footprint.** By decreasing water demands through conservation, this project will lead to energy savings and a reduced carbon footprint. This project will lower utility energy use by an estimated 6,331 MWh over the 25-year life span of this project. CO₂ emissions would be reduced by 2,532 metric tons over the 25-year life of this project, or 101 metric tons per year. These energy use savings do not include reduced in-home water heating costs, which can be a significant energy-using activity.
- **Public education.** Substantial benefits will occur through public education, both through formal training opportunities and through participants in the project servings as champions for water conservation.

Project 8: Sacramento Regional County Sanitation District/ Sacramento Power Authority Recycled Water Project (*Sacramento Regional County Sanitation District*)

The Sacramento Regional County Sanitation District (SRCSD)/Sacramento Power Authority (Authority) Recycled Water Project has both quantifiable and non-quantifiable benefits. The monetized water supply benefits are presented in Table 20. Additional qualitative water supply, water quality, and other benefits are as follows:

Qualitative Water Supply Benefits

- **Increased water supply reliability and local control.** The use of recycled water for the Cogeneration Plant provides reliability for the Cogeneration Plant, the City of Sacramento and the service area's residential customer. For commercial and industrial activities, like the Cogeneration Plant, water is often crucial to production activity and drought may curtail or disrupt production, making reliability very important; consequently, the few studies that have been conducted on these sectors indicate that commercial and industrial customers value supply reliability quite highly. For the City of Sacramento, the use of recycled water from the SRCSD plant allows the City to, in effect, expand their water supply portfolio with an existing source that is devoid of water rights issues, drought limitations, or other potential restrictions that might be imposed by entities outside the region. For the residential customers, the use of recycled water narrows the gap between normal water supply reliability and single and multiple dry water years, freeing up potable water supplies and thus increasing overall system reliability. As previously noted, residential and industrial customers seem to value water supply reliability quite highly.
- **Reduced groundwater pumping and overdraft.** The Sacramento Valley Groundwater Basin, like many groundwater basins in California, has a long history of problems with overdraft and land subsidence. Development of increased volumes of recycled water to offset groundwater pumping can be a significant benefit to the region by preventing increased costs associated with pumping water, drilling deeper wells, increasing water treatment, and/or purchasing surface water.

Qualitative Water Quality/Other Expected Benefits

- **Reduced groundwater pumping and overdraft.** Potential benefits of reducing groundwater overdraft are also significant for the environment. These may include the prevention of declines in river and stream flows that are hydrologically connected to the groundwater system. Potential flow reduction can negatively impact the populations of salmon and other native fish species. Groundwater overdrafting can also result in considerable costs for existing groundwater uses by increasing pumping costs and associated energy use, requiring some relatively shallow wells to be abandoned or deepened, and/or degrading the quality of the extractable waters. Overdrafts can also lead to land subsidence, with associated damages to private and public infrastructure (homes, roads, and so forth).
- **Reduced wastewater discharge and improvements in aquatic habitat.** Environmental groups support the recycling program because it reduces the amount of effluent discharged into the Sacramento River, and the resulting water quality improvements in the receiving waters are a

benefit to the general public. Additionally, improvements in water quality and reduced levels of wastewater discharge may help the SCRSD meet waste water discharge standards as they become stricter in the future and remain in compliance with the Clean Water Act and discharge regulations.

Project 9: North Antelope Booster Pump Station Project (*Sacramento Suburban Water District*)

The North Antelope Booster Pump Station Project has both quantifiable and non-quantifiable benefits. The monetized water supply benefits are presented in Table 20. Additional qualitative water supply and other benefits are as follows:

Qualitative Water Supply Benefits

- **Improved operational flexibility for Sacramento Suburban Water District (SSWD) and San Juan Water District.** By allowing two water districts to work together to maximize the beneficial use of available supply under a variety of water year types, the project provides an equitable, cost-effective water resource management strategy for enhancing operational flexibility for water users of Folsom Lake, the Lower American River, and the connected groundwater basin.
- **Reduction in current excess SSWD groundwater supply.** SSWD started significantly supplementing its groundwater supply with surface water in 1998 to address the declining groundwater table using in-lieu recharge. SSWD has made significant investments to put surface water supply and conjunctive use facilities in place and has excess groundwater supply capacity. The excess capacity was a key consideration in the SSWD's Water System Master Plan. Export of excess capacity maximizes the value of the SSWD's facility investments by optimizing water system capacity and generates revenue for SSWD to offset other system costs.

Qualitative Water Quality/Other Expected Benefits

- **Allows system to voluntarily use groundwater when doing so will contribute to maintaining water flow in the Delta.** By reducing the use of American River surface water, this project will augment in-stream flows in the Delta, or offset other diversions that may otherwise reduce flows. Reduced demands on Delta supplies will also help reduce the overall salinity of the Delta and improve Delta habitat, especially in dry years.

Project 10: Coyle Avenue & Roseview Park Pump Stations and Treatment System Project (*Sacramento Suburban Water District*)

The Coyle Avenue and Roseview Park Pump Stations and Treatment Systems Project has both quantifiable and non-quantifiable benefits. The monetized water supply benefits are presented in Table 20. Additional qualitative water supply, water quality, and other benefits are as follows:

Qualitative Water Supply Benefits

- **Conjunctive use in alignment with Water Forum Agreement and regional conjunctive water management objectives.** The new wells contribute to SSWD's conjunctive use program, which is in alignment with the Water Forum Agreement and regional conjunctive management objectives. The entire region is moving towards conjunctive management to meet goals for water storage of the seasonal winter surpluses. This project advances SSWD's conjunctive use program and the Water Forum's objectives in a cost-effective way.

Qualitative Water Quality/Other Expected Benefits

- **Expands water supply and reliability in an area of the District away from a regional groundwater contamination plume.** There are several groundwater contamination plumes near the southern portion of SSWD. These plumes contain perchlorate, N-Nitrosodimethylamine (NDMA), and various organic compounds. The siting of the two wells in this project will replace wells closer to these plumes with wells much farther north, outside of the regional contamination plume.
- **Supports regional objective of maintaining sufficient surface water in American River for habitat protection.** By strengthening SSWD's capacity to extract banked groundwater, there will be more groundwater supplies during dry periods and less stress on surface supplies in the American River. SSWD hopes to be able to use this capacity to support other water districts in the region facing a shortfall in dry years due to reductions in surface supplies. Regionally, this supports the goal of maintaining sustainable flows in the river for habitat protection.

Project 11: Willow Hill Pipeline Rehabilitation Project (*City of Folsom*)

The Willow Hill Pipeline Rehabilitation Project has both quantifiable and non-quantifiable benefits. The monetized water supply benefits are presented in Table 20. Additional qualitative water supply benefits are as follows:

Qualitative Water Supply Benefits

- **Increased water supply reliability.** There is uncertainty about the value of this to the City of Folsom's customers, as no current information exists based on revealed or stated preferences. However, general studies indicate that residential and industrial customers seem to value supply reliability quite highly.
- **Potential revenues from marketing surplus.** The water utility may benefit in the future from revenues earned from the sale of surplus supplies, or from banking the surplus and using it as part of a conjunctive use program.
- **Water availability for other utilities.** Other water districts will benefit from the project implementation in that the City of Folsom will not be competing for additional scarce water supplies on the Sacramento River. Additionally, in the future, if the City does not require their full water supply allocation, they can bank or market the surplus, benefiting other water districts

in need of temporary additional supplies and relieving additional pressures on key surface water bodies.

- **Help meet local, regional and State per capita water use goals.** Both the City of Folsom and the State will benefit from the reductions in per capita water use in support of the water conservation goals as stated in the State's *20x2020 Water Conservation Plan*.

Project 12: Lower American River Mile 0.5 Aquatic Riparian Habitat Enhancement Project (*Sacramento Area Flood Control Agency*)

The Lower American River Mile 0.5 Aquatic Riparian Habitat Enhancement Project has only non-quantifiable benefits. These qualitative water supply, water quality, flood reduction, and other benefits are as follows:

Qualitative Water Supply Benefits

- **Increased groundwater recharge.** Widening the inundated area at river mile 0.5 of the lower American River should increase the area available for groundwater recharge by a small amount. Expansion of the floodplain and more frequent inundation may increase percolation of American River surface water into the groundwater aquifer.

Qualitative Water Quality/Other Expected Benefits

- **Ecological decomposition of contaminants.** The project will increase the area of wetlands and riparian vegetation. These habitats have a well-documented capacity for ecological decomposition and biological uptake of contaminants. By expanding the riparian area and increasing the associated contaminant buffering capacity, the project will improve water quality in the lower American River and the important downstream waters.
- **Provide wetland and riparian habitat for species.** This project will create 1,100 feet of new shoreline with shaded riparian aquatic habitat, brush mattresses, and large instream woody debris. The project will also create 0.4 acres of shallow inundated habitat during the average summer river stage and 1.6 acres of inundated habitat during the average winter river stage. An additional 1.1 acres of frequently inundated floodplain habitat will be created for a total of 3.3 acres of restored riparian and wetland habitat. These habitat types are particularly beneficial for the juvenile stages of delta smelt (state endangered, federally threatened), steelhead trout (federally threatened), and the fall/late fall Chinook salmon run (not a special status species, but a popular sport fish). Additional species that could benefit include juvenile green sturgeon (federally threatened), spring run Chinook (state threatened, federally threatened), and winter run Chinook (state endangered, federally endangered).
- **Improved recreational opportunities.** The site is within a heavily-accessed public recreation area that experiences, on average, 5 million visitor-days of use per year. Fishing in the American River results in \$37 million in annual expenditures, a substantial portion of which could be lost without salmon and steelhead fishing. This project will help sustain these uses through improved fish habitat, especially for vulnerable juveniles. The presence of charismatic fish like

Chinook salmon supports nature appreciation on the river and downstream. Boaters on the river will find that the project adds visual interest to the landscape. Migratory birds using the riparian zone may be appreciated by bird watchers throughout the birds' migratory range.

- **Improved educational opportunities.** Education and interpretation of salmon and steelhead and their lifecycles and ecological roles are provided at the Nimbus fish hatchery, at the Effie Yeaw Nature Center, and along the American River Parkway trails. Increased presence of wild fish will make these interpretive opportunities more meaningful.

Qualitative Flood Damage Reduction Benefits

- **Flood damage reduction.** This has been developed to increase the frequency of flooded habitat available for fish in the American and Sacramento Rivers during spring and winter, and to provide improved habitat for birds and other wildlife species. These enhancements will be achieved by lowering and re-grading the over-steepened river bank at the site and improving the quality of the upland habitat on the adjacent elevated floodplain. By widening the inundated area at river mile 0.5 of the lower American River and increasing floodplain area, this project relieves flood flows in downstream areas.

Project 13: Lower Cosumnes River Floodplain Restoration Project (*Ducks Unlimited*)

The Lower Cosumnes River Floodplain Restoration Project has both quantifiable and non-quantifiable benefits. The monetized water quality benefits are presented in Table 20. Additional qualitative water supply, water quality, flood damage reduction, and other benefits are as follows:

Qualitative Water Supply Benefits

- **Increased groundwater recharge.** Creating an active floodplain at mile 2.5 of the Cosumnes River should increase the area available for groundwater recharge. Groundwater in the basin underlying the Cosumnes River is overdrafted to such an extent that the groundwater table has effectively separated from the baseflow of the river. By restoring approximately 143 acres of riparian floodplain forest, benefits could accrue to groundwater recharge.

Qualitative Water Quality/Other Expected Benefits

- **Ecological decomposition of contaminants.** Increasing inundation, especially for low flow events at mile 2.5 of the Cosumnes River should increase the area of wetlands and riparian forest vegetation significantly. These habitats have a well-documented capacity for ecological decomposition and biological uptake of contaminants. This significant increase in permanently inundated areas and increased frequency of inundation for the floodplain will expand the contaminant buffering capacity of these riparian areas and decrease contaminant loading in Cosumnes River water. This area can also slow river flows and allow sediment to deposit out of the river flow, especially in the slow moving backwaters of the restored wetlands and riparian areas. The Cosumnes River is on the 303d list as impaired for *E. Coli*, sediment toxicity, and invasive species. This project will directly address sediment toxicity.

- **Provide wetland and riparian habitat for species.** The project will result in the restoration of 143 acres of floodplain riparian habitat. By breaching the levee and de-leveling the floodplain, this project reconnects the River to its historic floodplain, restoring the hydrologic function of the site to facilitate the growth of planted and naturally colonizing riparian vegetation. The restored project site will allow low-flow floods to inundate the floodplain at shallow depths, which is important for ecosystem values because of nutrient cycling, invertebrate production, fish habitat, and overall floodplain productivity.
- **Greenhouse gas sequestration.** This project would result in the sequestration of carbon dioxide, a greenhouse gas that leads to global warming. By revegetating a currently seasonally inundated area with riparian forest, carbon dioxide will be removed from the atmosphere as trees and native grasses are replanted and grow, incorporating atmospheric CO₂ into biomass. Assuming a 50 year life for the habitat restoration, this project will sequester a total of 12,700 tons CO₂ over the project life.
- **Improve recreational opportunities.** The Lower Cosumnes River Floodplain Restoration Project will improve the waterfowl hunting experience by increasing the aesthetic of the hunting area and enhancing habitat values that are likely to bring more waterfowl to the site; furthermore, facilities such as access routes and hunting blinds will be improved with this project. The project will also improve fishing in the Cosumnes and Mokelumne Rivers, which is an important recreational activity primarily focused on salmon and Steelhead fishing, by improving fish habitat, especially for vulnerable juveniles. The presence of charismatic fish like Chinook salmon supports nature appreciation on the River and downstream. Migratory birds using the riparian zone may be appreciated by bird watchers throughout the birds' migratory range. The 500 feet of Americans with Disability Act (ADA) accessible paths on the project site allow all of these recreational benefits to be appreciated by the mobility impaired.
- **Improve educational opportunities.** The Cosumnes River Preserve is visited by over 10,000 school children annually. The restoration project will include educational and volunteering opportunities for youths and other Preserve visitors. The ecological education opportunities through this accessible site will improve dramatically as the floodplain restoration project unfolds, providing a hands-on interpretive opportunity for ecological restoration.

Qualitative Flood Damage Reduction Benefits

- **Flood damage reduction.** This project is expected to ameliorate the impacts from low flood stage events by reconnecting the River to the floodplain and adding about 10% to the overall Cosumnes River floodplain, thereby increasing the floodplain's holding capacity, attenuating flood peak, and reducing water velocity.

Project 14: OHWD / Rancho Murieta Groundwater Recharge Project (*Omochumne-Hartnell Water District & Rancho Murieta Community Services District*)

The OHWD/Rancho Murieta Groundwater Recharge Project has both quantifiable and non-quantifiable benefits. The monetized water supply benefits are presented in Table 20. Additional qualitative water supply and water quality benefits are as follows:

Qualitative Water Supply Benefits

- **Increased Groundwater Levels.** Groundwater levels in wells outside the influence of the Cosumnes River have fluctuated over the years as a result of increased groundwater use in dry years and more surface water use in wet and normal years. As water supply reliability becomes questionable with climate change, and as demands on water supplies increase with projected population increases, additional stress is placed on the local groundwater basin as a supply source. As groundwater levels fall, well users are forced to dig deeper, pump further, and/or resort to a different water source. This project is expected to raise the groundwater table and prevent the need for well users to require deeper drilling in order to reach potable supplies, both now and during future drought years
- **Additional Water Source/Supply Diversification.** An important aspect of supply reliability is creating more than one supply source. This proposed project diversifies local supplies (RMCSD currently only uses surface water), thereby ensuring supply availability, in case of a catastrophic event such as earthquake, terrorism, supply contamination, another water source is available.

Qualitative Water Quality/Other Expected Benefits

- **Restoration of Salmon Migration & Spawning Habitat.** A key benefit associated with this project is the potential for the rise in groundwater levels to provide in-stream flows during the seasonal dry times (early fall) in the Cosumnes River. This would allow for the return of historical salmonid migration and spawning activities to occur in the Cosumnes River. Recent studies have shown that, although the river often has some dry sections in summer, a half-century of groundwater pumping within the Cosumnes watershed has made those dry sections bigger (up to 20 miles long) and longer lasting. As a result, the scientists found that fall-run Chinook salmon could not travel upstream to spawn and young trees in the riparian forest could not survive. This project is expected to contribute to the reconnection of the Cosumnes River baseflow with the local aquifer- providing stream flows during the dry season when salmonid fisheries migrate and spawn

Project 15: Sleepy Hollow Detention Basin Retrofit Project (*City of Elk Grove*)

The Sleepy Hollow Detention Basin Retrofit Project has both quantifiable and non-quantifiable benefits. The monetized water supply benefits are presented in Table 20. Additional qualitative water supply, water quality and other benefits are as follows:

Qualitative Water Supply Benefits

- **Increased water supply reliability.** Although interest in water supply reliability is increasing, only a few studies have directly attempted to quantify its value. The results of these studies indicate that residential and industrial customers seem to value supply reliability quite highly. Stated preference studies find that the annual value of reliability ranges from \$95 to \$500 (in 2009 USD) per household for total reliability (i.e., a 0% probability of facing water restrictions in times of drought). This project will only enhance overall reliability but not guarantee 100% reliability. Because of uncertainty in the application of the literature to this project context, this benefit was not quantified.

Qualitative Water Quality/Other Expected Benefits

- **Improved surface water quality in Laguna Creek tributary.** As a result of the Sleepy Hollow Detention Basin Retrofit Project, a portion of the stormwater runoff and floodwaters diverted to the Sleepy Hollow Detention Basin will be used to recharge the groundwater aquifer, rather than be discharged to Laguna Creek tributary. This will result in improved surface water quality due to decreased pollutant loading associated with urban runoff. Additionally, increased basin vegetation and basin design modifications resulting from project implementation should improve the filtering capacity of the basin.
- **Improved upland habitat.** The improvement of 6.3 acres of upland habitat through native planting and the restoration of a more natural flow regime in Laguna Creek tributary (due to reduced stormwater and flood flows from the current detention basin) will result in significant benefits for native wildlife and habitat. According to the Laguna Creek Watershed Council, efforts to improve the quality of aquatic and riparian habitats along the banks of Laguna Creek and its tributaries have the potential to benefit 23 special-status plant and wildlife species. In addition, nearly 15 special-status plant and wildlife species depend on high-quality grasslands and vernal pools for their survival, and may benefit from upland habitat preservation and enhancements within the Laguna Creek Watershed.
- **Increased aesthetic, recreational and educational opportunities.** The upgraded detention basin will provide a number of public education opportunities. The City plans to coordinate with non-profit organizations, including the Laguna Creek Watershed Council and the Cosumnes Community Services District, to put educational programs in place. Once completed, the retrofitted basin will serve as a pilot/demonstration project to the Sacramento area and the local communities, demonstrating low impact development (LID) techniques, and will provide ‘outdoor classroom’ opportunities to five schools within a two-mile radius of the project site. In addition, the planting of native vegetation and new trails installed as part of the project

implementation will provide improved aesthetics and recreational opportunities for the local community as compared to existing conditions.

Qualitative Flood Damage Reduction Benefits

- **Additional flood control benefits.** In addition to continuing to provide existing flood control benefits, the project will improve the detention basin's flood attenuation performance as the proposed Darcy (dry) wells will intercept initial stormwater runoff volumes. The desired outcome of intercepting flows will be a reduction of the 100-year water surface elevation in the basin.

American River Basin
Attachment 10 – Costs and Benefits Summary

Table 20 - Proposal Project Costs and Benefits Summary
Proposal: American River Region IRWM Proposition 84 Implementation Grant Proposal
Agency: Regional Water Authority

Project No.	Project	Agency	Total Present Value Project Costs (1)	Total Present Value Project Benefits				B/C Ratio
				Water Supply (2)	Flood Damage Reduction (3)	Water Quality and Other (4)	Total	
	(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)
							(d) + (e) + (f)	(g) / (c)
1	City of Roseville ASR Program – Phase 2 Project	City of Roseville	\$3,826,701	\$2,556,966	\$0	+	\$2,556,966	0.7
2	Secret Ravine Fish Passage Improvement Project [1]	City of Roseville	\$394,477	\$0	\$0	\$403,754	\$403,754	1.0
3	E.A. Fairbairn Groundwater Well Project	City of Sacramento	\$4,308,689	\$17,524,076	\$0	+	\$17,524,076	4.1
4	Shasta Park Reservoir and Well Project	City of Sacramento	\$16,315,221	\$17,524,076	\$0	+	\$17,524,076	1.1
5	Antelope Creek Water Efficiency and Flood Control Improvement Project [2]	Placer County Flood Control and Water Conservation District	\$1,331,903	\$184,034	\$95,000	+	\$279,034	0.2
6	Regional Water Meter Retrofit Acceleration Project	Regional Water Authority	\$900,051	\$758,338	\$0	+	\$758,338	0.8
7	Regional Indoor and Outdoor Water Efficiency Project	Regional Water Authority	\$837,742	\$1,762,921	\$0	+	\$1,762,921	2.1
8	SRCS/SPA Recycled Water Project	Sacramento Regional County Sanitation District	\$9,444,591	\$7,580,209	\$0	+	\$7,580,209	0.8
9	North Antelope Booster Pump Station Project	Sacramento Suburban Water District	\$837,400	\$3,216,992	\$0	+	\$3,216,992	3.8

American River Basin
Attachment 10 – Costs and Benefits Summary

Table 20 - Proposal Project Costs and Benefits Summary
Proposal: American River Region IRWM Proposition 84 Implementation Grant Proposal
Agency: Regional Water Authority

Project No.	Project	Agency	Total Present Value Project Costs (1)	Total Present Value Project Benefits				B/C Ratio
				Water Supply (2)	Flood Damage Reduction (3)	Water Quality and Other (4)	Total	
	(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)
							(d) + (e) + (f)	(g) / (c)
10	Coyle Avenue & Roseview Park Pump Stations and Treatment Systems Project	Sacramento Suburban Water District	\$6,058,750	\$11,325,720	\$0	+	\$11,325,720	1.9
11	Willow Hill Pipeline Rehabilitation Project	City of Folsom	\$6,448,680	\$13,442,660	\$0	+	\$13,442,660	2.1
12	Lower American River Mile 0.5 Aquatic Riparian Habitat Enhancement Project [3]	Sacramento Area Flood Control Agency	\$1,992,876	\$0	\$0	++	\$0	0.0
13	Lower Cosumnes River Floodplain Restoration Project [1]	Ducks Unlimited	\$1,049,639	\$0	\$0	\$1,055,023	\$1,055,023	1.0
14	OHWD/Rancho Murieta Groundwater Recharge Project	OHWD/Rancho Murieta Community Services District	\$2,526,087	\$3,425,044	\$0	+	\$3,425,044	1.4
15	Sleepy Hollow Detention Basin Retrofit Project	City of Elk Grove	\$867,723	\$106,144	\$0	+	\$106,144	0.1
	TOTAL		\$57,140,530	\$79,407,180	\$95,000	\$1,458,777	\$80,960,957	1.4

Comments: "+" or "++" indicates non-monetized benefits, typically including reduced energy demands and reduced carbon footprint, and/or improved ecosystems/habitat, and/or reduced stress on the greater Bay-Delta system. [1] Benefits from salmon population impacts probably higher than stated, as the analysis of increased salmon population values shown here was developed as a "break-even analysis" to provide a sense of proportion. [2] Lining of the canal will result in avoided water losses of up to 125 AF per year. Flood control benefits reflect Phase 1 only. [3] No quantification and monetization of benefits was feasible, but appreciable habitat and associated ecosystem values are nonetheless anticipated.